450196

FLOOD INSURANCE STUDY

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YORK COUNTY

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OCTOBER 1, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 450196

FEMA 209

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Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

FLOOD INSURANCE STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Rock Hill, York County, South Carolina, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Rock Hill to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

Streams to be studied by detailed and approximate methods were identified at a meeting attended by representatives of the community, the Federal Insurance Administration, and the study contractor. The U.S. Army Corps of Engineers and the Rock Hill Planning Commission provided information which was used in this study.

The results of this study were reviewed at a final community coordination meeting held on January 29, 1980. Attending the meeting were representatives of the Federal Insurance Administration, the study contractor, and the city. This study incorporates all appropriate comments, and all problems have been resolved.

1.3 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

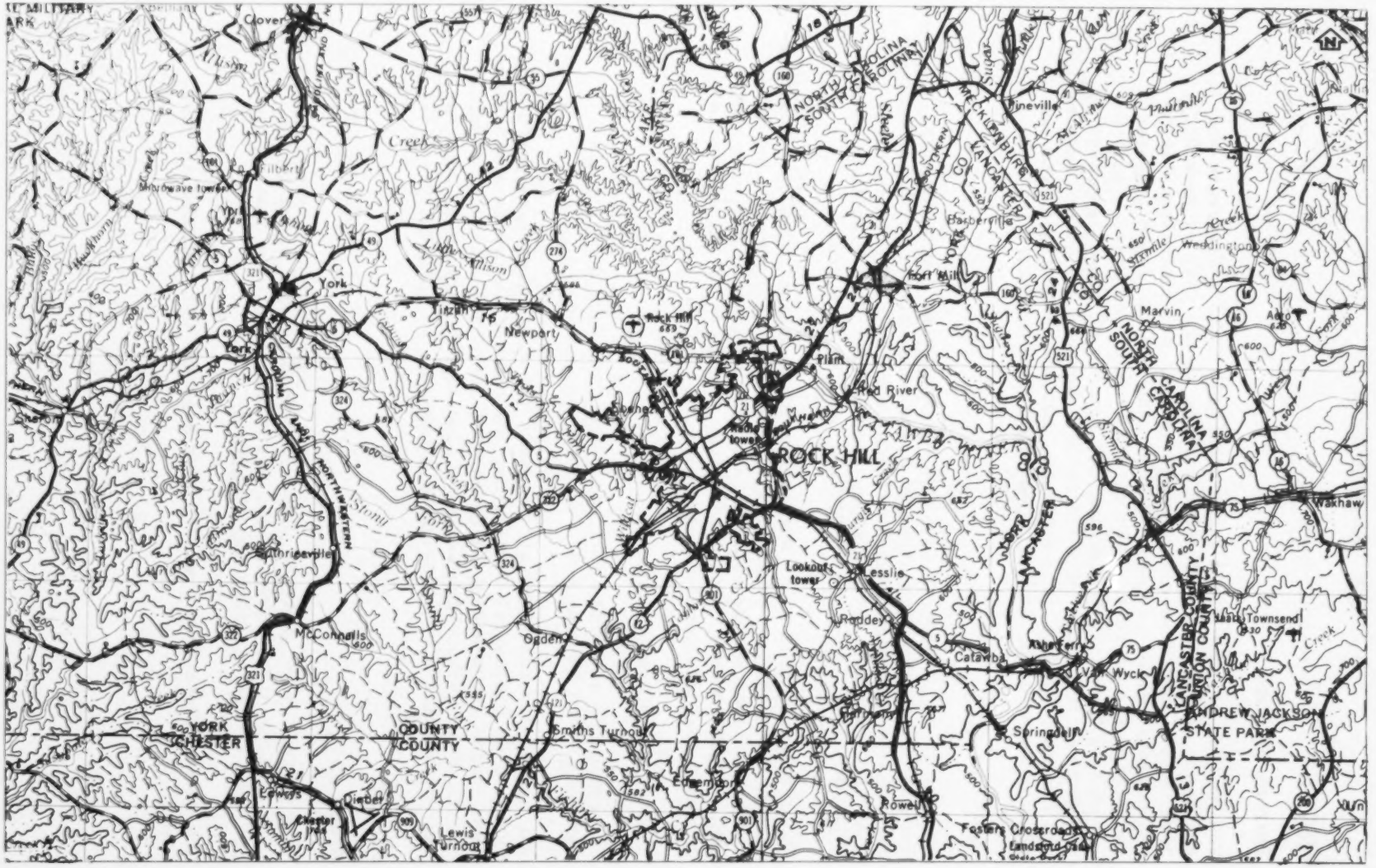
The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey, for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 15. This work, which was completed in February 1979, covered all significant flooding sources affecting the City of Rock Hill.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Rock Hill, York County, South Carolina. The area of study is shown on the Vicinity Map (Figure 1).

The area of York County within Rock Hill was not included in this study.


ROCK HILL
York
Clover
Fort Mill
Lesslie
Catawba
Wyck
Springdale
Marvin
Waxhaw
Townsend
Newport
Filbert
Lewis Turnout
Smyrna Turnout
Edgemoor
Rowell
Western Crossroads
Landsford
Lookout tower
Radley
Ogden
McConnells
Chester
Lewisville
Harrisburg
Harrisburg
Pineville
Harrisburg
Indian Land
Wyck
Wyck
Wyck

Streams studied by detailed methods were Little Dutchman Creek, Little Dutchman Creek Tributary No. 1, Little Dutchman Creek Tributary No. 1-A, Catawba River Tributary, Manchester Creek, Manchester Creek Tributary No. 2, Manchester Creek Tributary No. 3, Taylors Creek Tributary No. 1, Taylors Creek Tributary No. 2, Wildcat Creek Tributary No. 1, Wildcat Creek Tributary No. 2, and Stoney Branch.

Approximate analyses were used to study those areas having a low-development potential or minimal flood hazards. Portions of Little Dutchman Creek, Little Dutchman Creek Tributary No. 1-A, Catawba River Tributary, Manchester Creek Tributary No. 2, Wildcat Creek, Wildcat Creek Tributary No. 2, Wildcat Creek Tributary No. 4, Taylor Creek Tributary No. 2-A, Stoney Branch, Stoney Branch Tributary No. 2, and Stoney Branch Tributary No. 3 were studied by approximate methods.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1984.

2.2 Community Description

Rock Hill is in southeastern York County, in northern South Carolina, near the North Carolina border. The city, which is in the Piedmont province, is entirely surrounded by unincorporated areas of York County. Incorporated in 1870, Rock Hill is now the fifth largest city in South Carolina. The population in 1970 was 33,846, and, in 1975, it was 35,346 (Reference 1). The present population is estimated to be 36,500.

Development in the city is a mixture of residential areas, small businesses, shopping centers, and educational centers. Much of the flood plain area is undeveloped. The sparse development there is similar to that in the rest of the city. Primary and secondary highways and complete railroad facilities service the city.

Drainage is generally away from the center of the city. It flows in all directions into small streams. There are no major rivers in Rock Hill; however, the Catawba River is a short distance to the northeast.

The land is nearly level to strongly sloping, except in the northwest, where it is gently sloping to moderately steep.

Soils along the streams are a mixture of alluvial types and sandy silt loam. In the northwest, the subsoil is red to brown and friable to slightly plastic, and the remainder of the city has a yellowish brown to red, firm clay subsoil (Reference 2).

Vegetation in the undeveloped flood plains consists of hardwoods and underbrush.

The climate is characterized by mild summers and winters. The average annual temperature is approximately 60°F. The fairly well distributed annual precipitation averages approximately 46 inches. The 100-year, 3-hour rainfall is 4.5 inches, and the 100-year, 6-hour rainfall is 6 inches (Reference 3).

2.3 Principal Flood Problems

Major floods in Rock Hill occur as a result of tropical storms (hurricanes) or local thunderstorms. Due to the fairly steep slopes and the small size of the drainage basins, the streams rise rapidly after an intense rainfall, and floods occur within a short time. The principal flood problems in Rock Hill are caused by trees and brush that grow along the streams and manmade obstructions, such as bridges, culverts, buildings, and dams.

Flooding has occurred on numerous occasions. Although streamflow records are not available for the streams in Rock Hill, significant flooding is known to have occurred in March 1959, August 1967, and January 1973.

2.4 Flood Protection Measures

There are no flood protection structures in Rock Hill. The National Oceanic and Atmospheric Administration maintains year-round surveillance of weather conditions at Rock Hill. Tornado watch alerts, flood warnings, and anticipated weather conditions for the Rock Hill area are issued by the National Weather Service Office at Columbia, South Carolina.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual occurrence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each stream studied in detail in the community.

A flood frequency report by the U.S. Geological Survey (Reference 4) was used to determine flood frequencies for streams studied in detail. This report is based on a log-Pearson Type III analysis (Reference 5) of individual station records and a regionalization of the frequency data and basin characteristics using multiple-regression techniques. Flood discharges for Stoney Branch and Stoney Branch Tributary No. 3 were taken from a Flood Plain Information report by the U.S. Army Corps of Engineers (Reference 6). The Intermediate Regional Flood was used as the 100-year flood. Peak discharge-drainage area relationships for Little Dutchman Creek, Little Dutchman Creek Tributary No. 1, Little Dutchman Creek Tributary No. 1-A, Catawba River Tributary, Manchester Creek, Manchester Creek Tributary No. 2, Manchester Creek Tributary No. 3, Taylors Creek Tributary No. 1, Taylors Creek Tributary No.2, Wildcat Creek Tributary No. 1, Wildcat Creek Tributary No. 2, and Stoney Branch are shown in Table 1.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in the community.

Water-surface elevations for floods of the selected recurrence intervals were computed through use of the U.S. Geological Survey E-431 step-backwater computer program (Reference 7).

Cross section data for streams in the study area were obtained by field survey. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second) 10-Year	50-Year	100-Year	500-Year
Little Dutchman Creek					
At Mouth	7.2	1780	2850	3290	4550
Above Little Dutchman Creek Tributary No. 1	3.4	1050	1790	2110	3150
Little Dutchman Creek Tributary No. 1					
At Mouth	3.6	1260	2060	2410	3400
Above Little Dutchman Creek Tributary No. 1-A	2.5	880	1510	1800	2620
At Most Downstream Corporate Limits	1.4	650	1140	1370	2020
Little Dutchman Creek Tributary No. 1-A					
At Mouth	1.0	500	910	1110	1720
Catawba River Tributary					
At Mouth	1.42	570	1010	1270	1900
At South Carolina Highway 161	0.82	440	810	1000	1500

Table 1. Summary of Discharges (Continued)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second) 10-Year	50-Year	100-Year	500-Year
Manchester Creek					
Above Manchester Creek Tributary No. 2	2.70	900	1550	1850	2700
Above Manchester Creek Tributary No. 3	1.30	580	1050	1280	1940
At Southern Railway	0.50	340	640	800	1240
Manchester Creek Tributary No. 2					
At Mouth	0.94	420	790	980	1520
Manchester Creek Tributary No. 3					
At Mouth	1.10	580	1020	1240	1850
Taylors Creek Tributary No. 1					
At Corporate Limits	0.92	510	920	1120	1750
At Albright Road	0.40	320	620	770	1480
Taylors Creek Tributary No. 2					
At Most Upstream Corporate Limits	1.80	760	1320	1580	2370
At Blackman Street	0.80	440	760	1000	1700

Table 1. Summary of Discharges (Continued)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second) 10-Year	50-Year	100-Year	500-Year
Wildcat Creek Tributary No. 1					
At Corporate Limits	1.58	750	1300	1550	2250
At Reynolds Street	0.52	340	640	800	1240
Wildcat Creek Tributary No. 2					
At Most Upstream Corporate Limits	0.70	390	710	880	1360
At West Main Street	0.48	310	590	750	1180
Stoney Branch					
At Mouth	3.15	1000	1750	2250	3300
At South Carolina Highway 243	2.66	950	1600	2170	3000
Above Stoney Branch Tributary No. 1	1.75	820	1380	1840	2600
Above Stoney Branch Tributary No. 2	1.08	680	1160	1550	2170

Roughness coefficients (Manning's "n") for the computations were assigned on the basis of field inspection of stream channels and flood plain areas (Reference 8). The average roughness values selected were 0.040 for the main channels and 0.100 for the flood plain areas.

Starting water-surface elevations were determined by the slope-conveyance method.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

Supercritical flow-routing procedures were used to compute water-surface elevations at a few cross sections in the upper reaches of some of the streams in the study area. Where supercritical water-surface elevations were found, the elevations were converted to sub-critical elevations, and those elevations were used on the profiles.

Some of the highway and railroad stream crossings form embankments which act as ponds. The resulting storage is significant because of the small drainage areas involved and because the storage would tend to reduce the computed flood levels as well as the peak outflow. An inflow hydrograph was developed and routed through the individual ponds. A reservoir routing report (Reference 9) was used to determine elevations of the various floods at these crossings. This report routes a known inflow hydrograph downstream through an uncontrolled reservoir to form an outflow hydrograph. The inflow hydrograph was developed from rainfall-runoff relations and hydrographs from other small streams. The rainfall data were taken from U.S. Weather Bureau Technical Paper 40 (Reference 3). A modified Puls method was used for routing computations. Downstream discharges were not reduced, thus allowing for the possibility of improved drainage through upstream embankments.

For the streams studied by approximate methods, the boundary of the 100-year flood was developed from normal depth calculations and the topographic maps (Reference 10).

During floods, debris collecting at bridges, culverts, or channels and flood plain obstructions could decrease the carrying capacity of the watercourse and cause greater water depths (backwater effect) upstream of the obstructions. However, because the occurrence and amount of debris are indeterminate factors, only the physical characteristics of the structures were considered in preparing the profiles. Flood elevations, as shown on the profiles, are, thus, considered valid only if hydraulic structures, in general, remain unobstructed and do not fail during floods.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage State and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2400, with a contour interval of 5 feet (Reference 10).

Approximate boundaries were delineated using the same maps (Reference 10).

Boundaries of the 100-year floods for the Stoney Branch and Stoney Branch Tributary No. 3 were taken from the maps in the Flood Plain Information report (Reference 6).

In cases where the 100- and 500-year flood boundaries are close together, only the 100-year flood boundary has been shown.

Flood boundaries for the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2).

Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, and/or lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity and increases flood heights, thus increasing

flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. As minimum standards, the Federal Insurance Administration limits such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year flood boundaries are close together, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Little Dutchman Creek								
A	1,360	150/30 [2]	720	4.6	522.0	522.0	522.3	0.3
B	2,030	150	630	5.2	524.9	524.9	524.9	0.0
C	3,330	150/70 [2]	470	4.5	529.4	529.4	529.7	0.3
Little Dutchman Creek Tributary No. 1								
A	840	100	890	2.7	530.0	530.0	530.0	0.0
B	960	100	740	3.2	530.8	530.8	530.8	0.0
C	1,940	100	530	4.6	531.8	531.8	532.8	1.0
D	2,940	100	270	5.8	534.7	534.7	534.7	0.0
E	3,700	100 [3]	290	5.4	536.9	536.9	536.9	0.0
F	4,550	80 [3]	220	7.2	542.7	542.7	543.5	0.8
G	5,350	50	280	5.6	549.4	549.4	549.7	0.3
H	5,430	100	1,040	1.5	561.5	561.5	561.5	0.0
I	6,700	100 [3]	810	2.0	563.4	563.4	563.6	0.2
J	7,560	80 [3]	220	7.2	565.4	565.4	566.0	0.6
K	8,410	100/40 [2]	370	3.7	570.2	570.2	570.8	0.6
L	9,520	80/30 [2]	160	8.6	572.2	572.2	573.2	1.0
M	10,500	100/50 [2]	210	6.5	581.8	581.8	581.8	0.0
N	11,350	100	190	7.1	588.1	588.1	588.1	0.0
O	11,430	100	450	3.0	589.5	589.5	589.5	0.0
P	12,400	100	150	6.9	596.0	596.0	597.0	1.0
Q	13,880	50	230	4.5	610.2	610.2	610.2	0.0

[1] Feet Above Mouth [2] Width/Width Within Corporate Limits [3] Floodway Lies Entirely Outside Corporate Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOODWAY DATA

LITTLE DUTCHMAN CREEK - LITTLE DUTCHMAN CREEK TRIBUTARY NO.1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Little Dutchman Creek Tributary No. 1-A								
A	730	60	172	6.4	538.8	538.8	539.0	0.2
B	1,670	53	160	6.9	547.5	547.5	547.5	0.0
C	2,870	50	190	5.9	561.4	561.4	562.4	1.0
D	3,560	40	102	7.2	570.7	570.7	571.4	0.7
Catawba River Tributary								
A	4,460	50	190	6.7	563.3	563.3	564.3	1.0
B	4,580	140	350	3.6	566.1	566.1	566.3	0.2
C	5,490	140/30[2]	550	2.3	567.8	567.8	568.5	0.7
Manchester Creek								
A	20,280	100	580	3.2	568.2	568.2	568.7	0.5
B	21,850	100	280	4.6	570.3	570.3	571.0	0.7
C	22,660	30	125	10.4	573.3	573.3	573.5	0.2
D	22,730	60	230	5.5	575.8	575.8	575.8	0.0
E	23,730	60	220	5.8	583.1	583.1	583.1	0.0
F	23,820	60	290	4.4	583.8	583.8	583.9	0.1
G	23,980	60	190	5.5	584.2	584.2	584.2	0.0
H	24,040	60	200	5.3	584.4	584.4	584.4	0.0
I	24,120	60	190	5.5	584.5	584.5	584.6	0.1
J	24,400	29	133	7.8	585.1	585.1	585.1	0.0
K	25,010	25	138	7.5	589.9	589.9	589.9	0.0
L	25,090	50	190	5.4	592.2	592.2	592.3	0.1
M	26,540	34	104	7.7	602.6	602.6	602.6	0.0

[1]Feet Above Mouth [2]Width/Width Within Corporate Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOODWAY DATA

LITTLE DUTCHMAN CREEK TRIBUTARY NO.1 -A - CATAWBA RIVER TRIBUTARY MANCHESTER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Manchester Creek Tributary No. 2								
A	1,480	40	240	4.0	570.7	570.7	570.7	0.0
B	3,570	40	190	5.1	576.8	576.8	577.3	0.5
Manchester Creek Tributary No. 3								
A	430	410	360	3.4	572.2	572.2	572.2	0.0
B	510	450	1,260	1.0	576.1	576.1	576.1	0.0
C	2,510	80	160	7.8	597.0	597.0	597.4	0.4
D	3,280	80	260	4.8	605.8	605.8	605.8	0.0
Taylors Creek Tributary No. 1								
A	5,950	100	305	3.7	569.6	569.6	570.1	0.5
B	6,170	100	200	5.6	570.1	570.1	570.7	0.6
C	6,900	100	403	2.8	572.4	572.4	573.1	0.7
D	7,780	100	286	3.9	575.9	575.9	576.2	0.3
E	10,930	80	217	3.6	593.9	593.9	594.4	0.5

[1]Feet Above Mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOODWAY DATA

MANCHESTER CREEK TRIBUTARY NO. 2-MANCHESTER CREEK TRIBUTARY NO. 3-TAYLORS CREEK TRIBUTARY NO. 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Taylors Creek Tributary No. 2								
A	4,650	100/50[2]	390	4.0	552.7	552.7	553.2	0.5
B	5,550	100[3]	350	4.4	557.7	557.7	557.9	0.2
C	6,080	100	360	3.5	560.5	560.5	560.9	0.4
D	7,000	100	330	5.5	568.7	568.7	569.4	0.7
E	8,230	80	440	2.8	578.6	578.6	578.9	0.3
F	9,230	80	140	7.2	594.1	594.1	594.1	0.0
G	9,300	80	220	4.5	595.6	595.6	595.6	0.0
H	9,380	80	310	3.3	595.9	595.9	596.1	0.2
I	9,950	75	210	4.8	600.2	600.2	601.2	1.0

[1]Feet Above Mouth [2]Width/Width Within Corporate Limits [3]Floodway Lies Entirely Outside Corporate Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOODWAY DATA

TAYLORS CREEK TRIBUTARY NO. 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Wildcat Creek Tributary No. 1								
A	6,940	80	250	4.9	576.3	576.3	576.3	0.0
B	8,230	80	250	5.0	582.0	582.0	582.4	0.4
C	9,330	80	200	4.0	590.6	590.6	590.7	0.1
D	9,480	60	180	4.5	592.7	592.7	592.7	0.0
E	9,960	40	85	9.5	598.8	598.8	598.8	0.0
Wildcat Creek Tributary No. 2								
A	3,500	50/35[2]	200	4.4	570.8	570.8	570.8	0.0
B	4,100	50	180	4.8	573.7	573.7	573.8	0.1
C	4,900	50	160	5.4	581.0	581.0	581.0	0.0
D	5,450	50	180	5.0	586.3	586.3	586.7	0.4
E	6,000	50/25[2]	170	5.1	591.8	591.8	591.9	0.1
Stoney Branch								
A	3,350	150[3]	850	2.6	530.5	530.5	531.5	1.0
B	4,480	150/75[2]	970	2.3	535.7	535.7	536.2	0.5
C	5,370	150/80[2]	700	3.1	537.7	537.7	538.0	0.3
D	13,000	100	470	3.3	569.5	569.5	570.0	0.5

[1]Feet Above Mouth [2]Width/Width Within Corporate Limits [3]Floodway Lies Entirely Outside Corporate Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOODWAY DATA

WILDCAT CREEK TRIBUTARY NO.1 - WILDCAT CREEK TRIBUTARY NO.2 - STONEY BRANCH

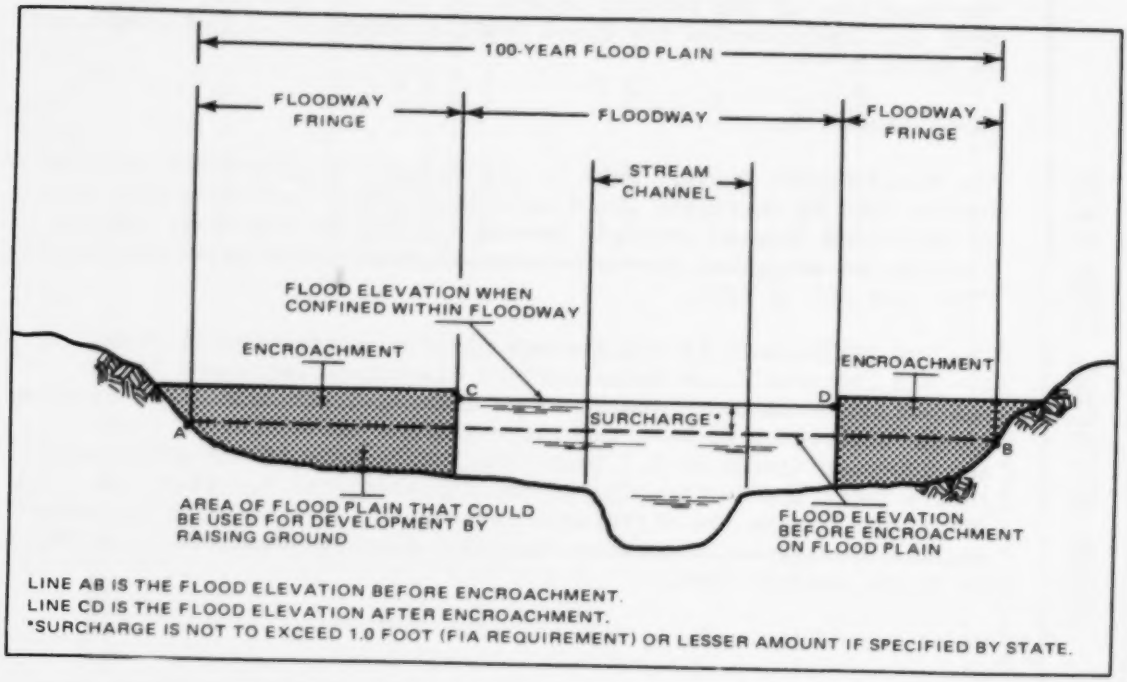

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

Figure 2. Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting Rock Hill.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of Rock Hill are shown on the Flood Profiles (Exhibit 1) and summarized in Table 3.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on the FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between the water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of the City of Rock Hill was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or Flood Hazard Factors determined.
Zones A2-A8:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Little Dutchman Creek							
Reach 1	0002	-1.5	-0.4	0.8	015	A3	Varies - See Map
Reach 2	0002	-2.0	-0.5	1.1	020	A4	Varies - See Map
Little Dutchman Creek Tributary No. 1							
Reach 1	0002	-1.6	-0.6	1.2	015	A3	Varies - See Map
Reach 2	0002	-2.3	-0.6	1.1	025	A5	Varies - See Map
Reach 3	0002	-3.3	-0.8	1.4	035	A7	Varies - See Map
Reach 4	0002	-2.2	-0.6	1.6	020	A4	Varies - See Map
Reach 5	0002	-4.0	-1.6	1.0	040	A8	Varies - See Map
Reach 6	0002,0004	-2.1	-0.5	1.3	020	A4	Varies - See Map
Little Dutchman Creek Tributary No. 1-A							
Reach 1	0002	-2.9	-0.9	1.4	030	A6	Varies - See Map
Reach 2	0002	-1.6	-0.5	0.8	015	A3	Varies - See Map
Catawba River Tributary							
Reach 1	0002	-1.8	-0.6	0.9	020	A4	Varies - See Map
Manchester Creek							
Reach 1	0004	-1.8	-0.5	1.1	020	A4	Varies - See Map
Reach 2	0004	-0.8	-0.2	1.4	010	A2	Varies - See Map
Reach 3	0004	-2.7	-1.2	1.5	025	A5	Varies - See Map

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD INSURANCE ZONE DATA

LITTLE DUTCHMAN CREEK - LITTLE DUTCHMAN CREEK TRIBUTARY NO.1 - LITTLE DUTCHMAN CREEK TRIBUTARY NO.1-A - CATAWBA RIVER TRIBUTARY - MANCHESTER CREEK

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Manchester Creek Tributary No. 2							
Reach 1	0004	-3.6	-1.2	3.0	035	A7	Varies-See Map
Reach 2	0004	-1.7	-0.7	1.9	015	A3	Varies-See Map
Manchester Creek Tributary No. 3							
Reach 1	0004	-0.8	-0.3	0.7	010	A2	Varies-See Map
Reach 2	0004	-2.0	-0.6	1.2	020	A4	Varies-See Map
Reach 3	0004	-1.0	-0.4	0.5	010	A2	Varies-See Map
Taylors Creek Tributary No. 1							
Reach 1	0006	-1.1	-0.3	0.8	010	A2	Varies-See Map
Taylors Creek Tributary No. 2							
Reach 1	0006	-1.2	-0.4	0.8	010	A2	Varies-See Map
Wildcat Creek Tributary No. 1							
Reach 1	0003,0004	-1.6	-0.3	0.9	015	A3	Varies-See Map
Wildcat Creek Tributary No. 2							
Reach 1	0003	-1.3	-0.3	0.7	015	A3	Varies-See Map
Stoney Branch							
Reach 1	0005	-2.5	-1.3	1.1	025	A5	Varies-See Map

[1]Flood Insurance Rate Map Panel [2]Weighted Average [3]Rounded to Nearest Foot

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD INSURANCE ZONE DATA

MANCHESTER CREEK TRIBUTARY NO. 2 - MANCHESTER CREEK TRIBUTARY NO. 3 - TAYLORS CREEK TRIBUTARY NO. 1 - TAYLORS CREEK TRIBUTARY NO. 2 - WILDCAT CREEK TRIBUTARY NO. 1 - WILDCAT CREEK TRIBUTARY NO. 2 - STONEY BRANCH

less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

The flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are summarized in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Rock Hill is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

A Flood Insurance Study for York County, South Carolina is being prepared (Reference 11). This study will be in agreement with that study.

The Federal Insurance Administration previously published a Flood Hazard Boundary Map for the City of Rock Hill, South Carolina (Reference 12). This Flood Insurance Study is more detailed and, thus, supersedes that map.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, 1375 Peachtree Street, NE., Atlanta, Georgia 30309.

8.0 BIBLIOGRAPHY AND REFERENCES

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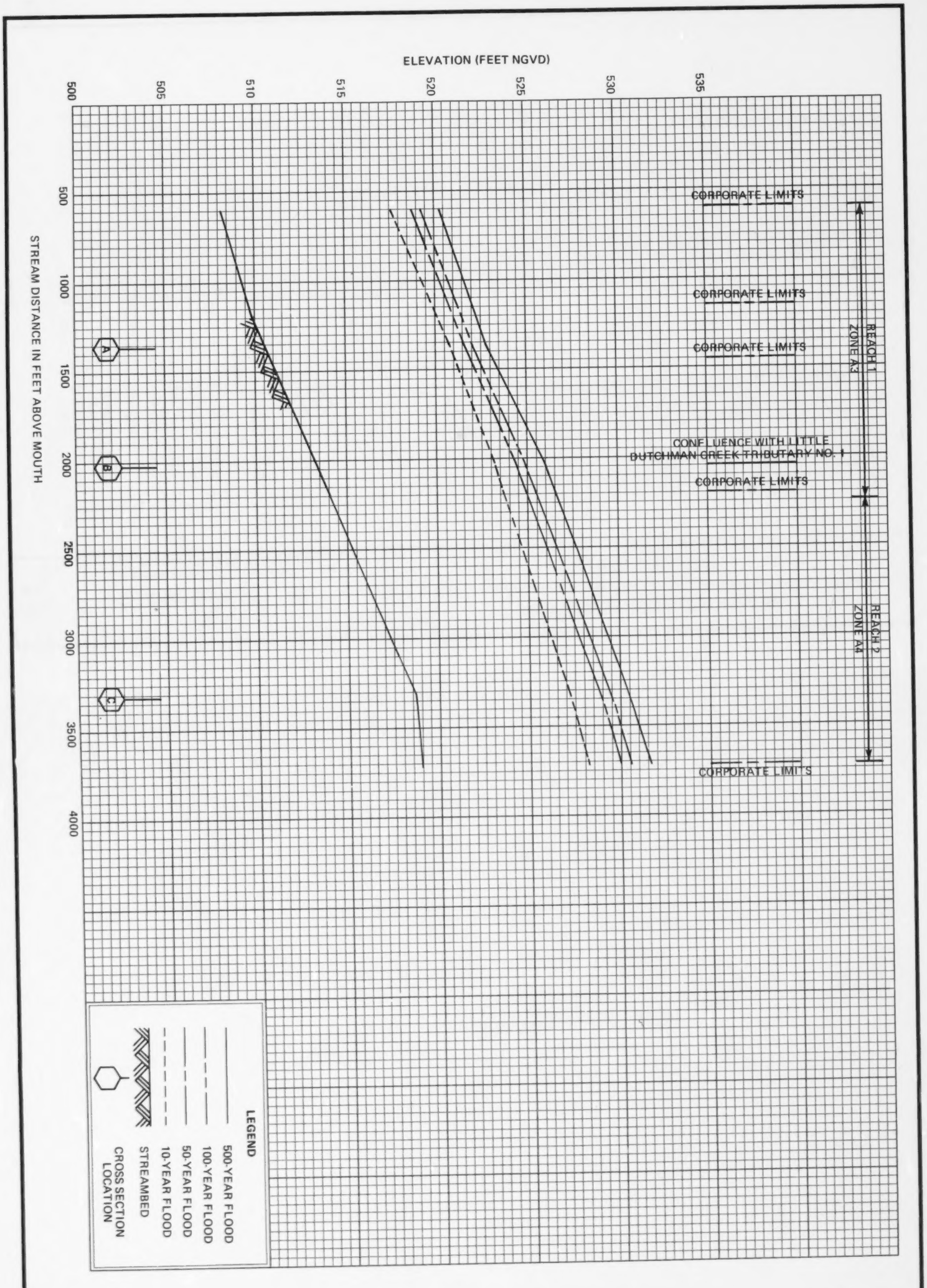


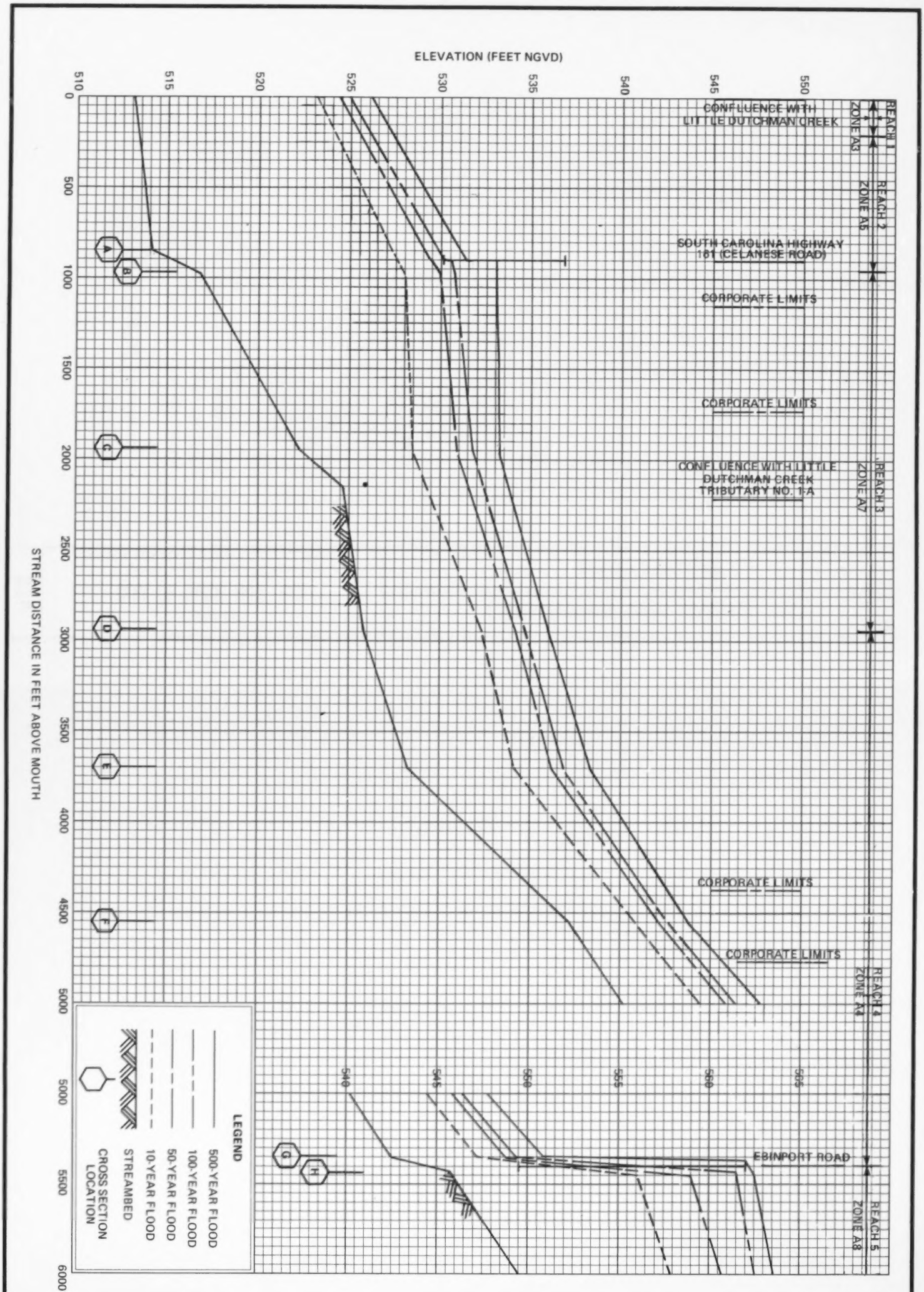
01P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

LITTLE DUTCHMAN CREEK



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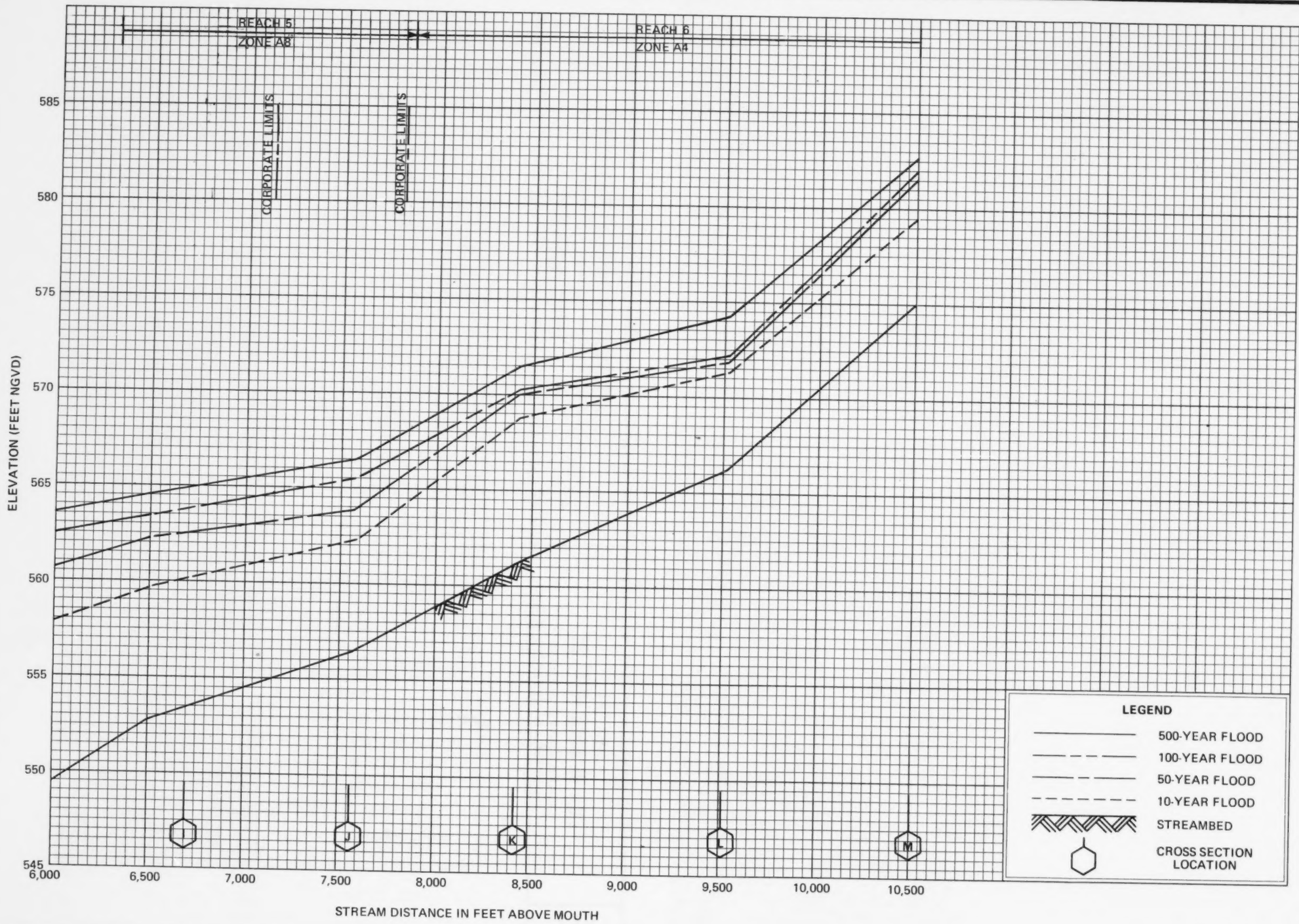
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

LITTLE DUTCHMAN CREEK TRIBUTARY NO. 1



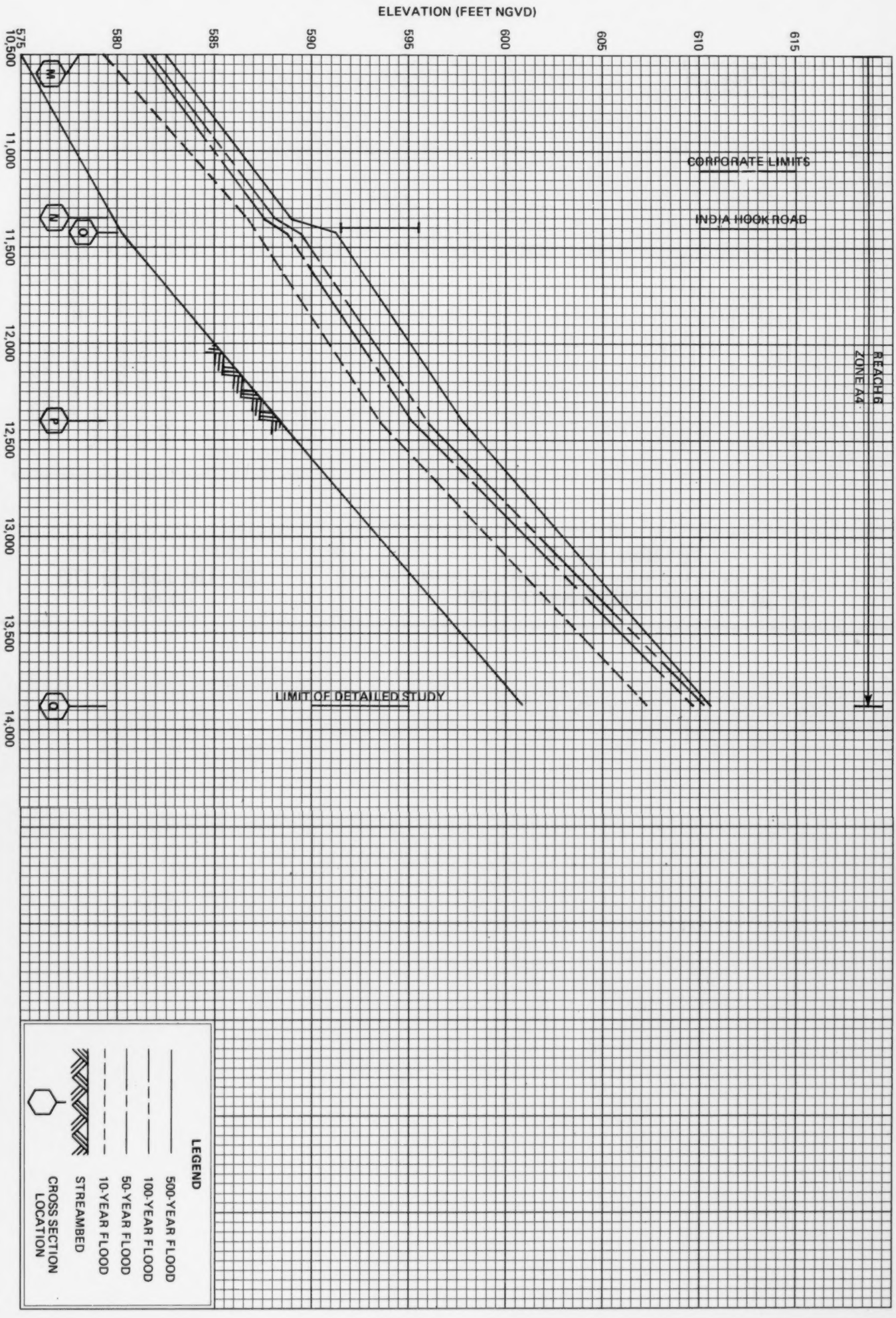
FLOOD PROFILES

LITTLE DUTCHMAN CREEK TRIBUTARY NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

03P



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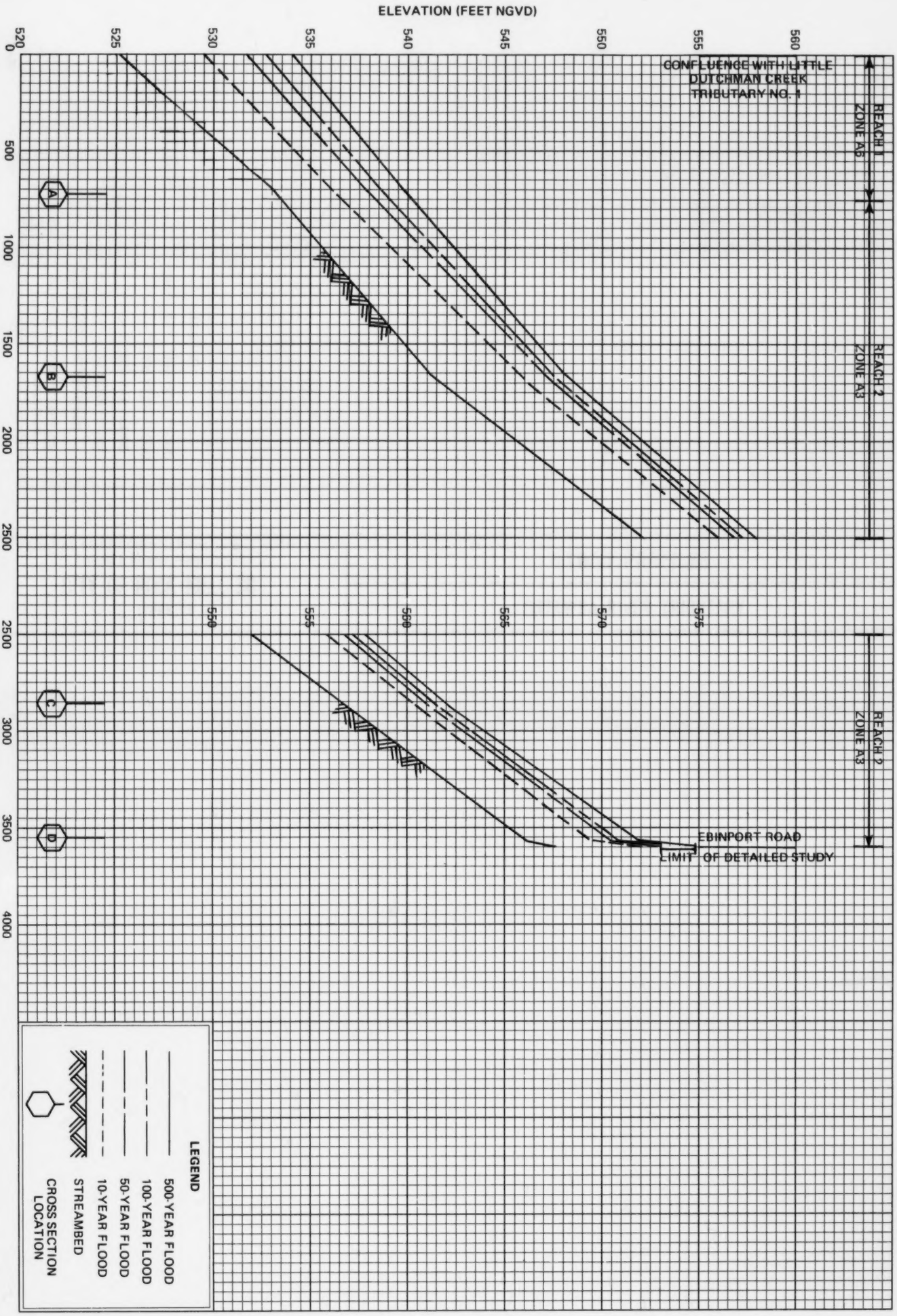
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

LITTLE DUTCHMAN CREEK TRIBUTARY NO. 1



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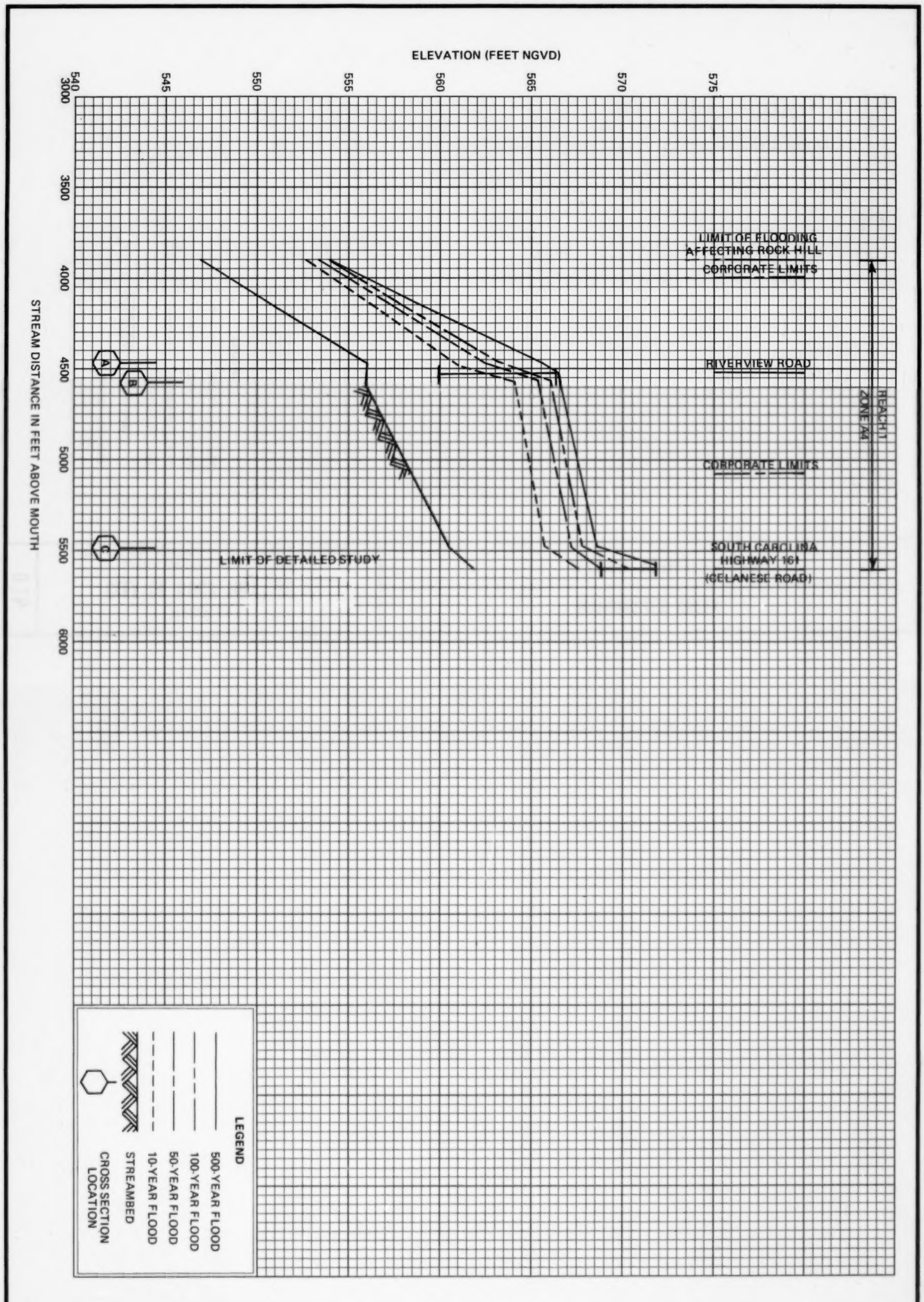
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

LITTLE DUTCHMAN CREEK TRIBUTARY NO. 1-A



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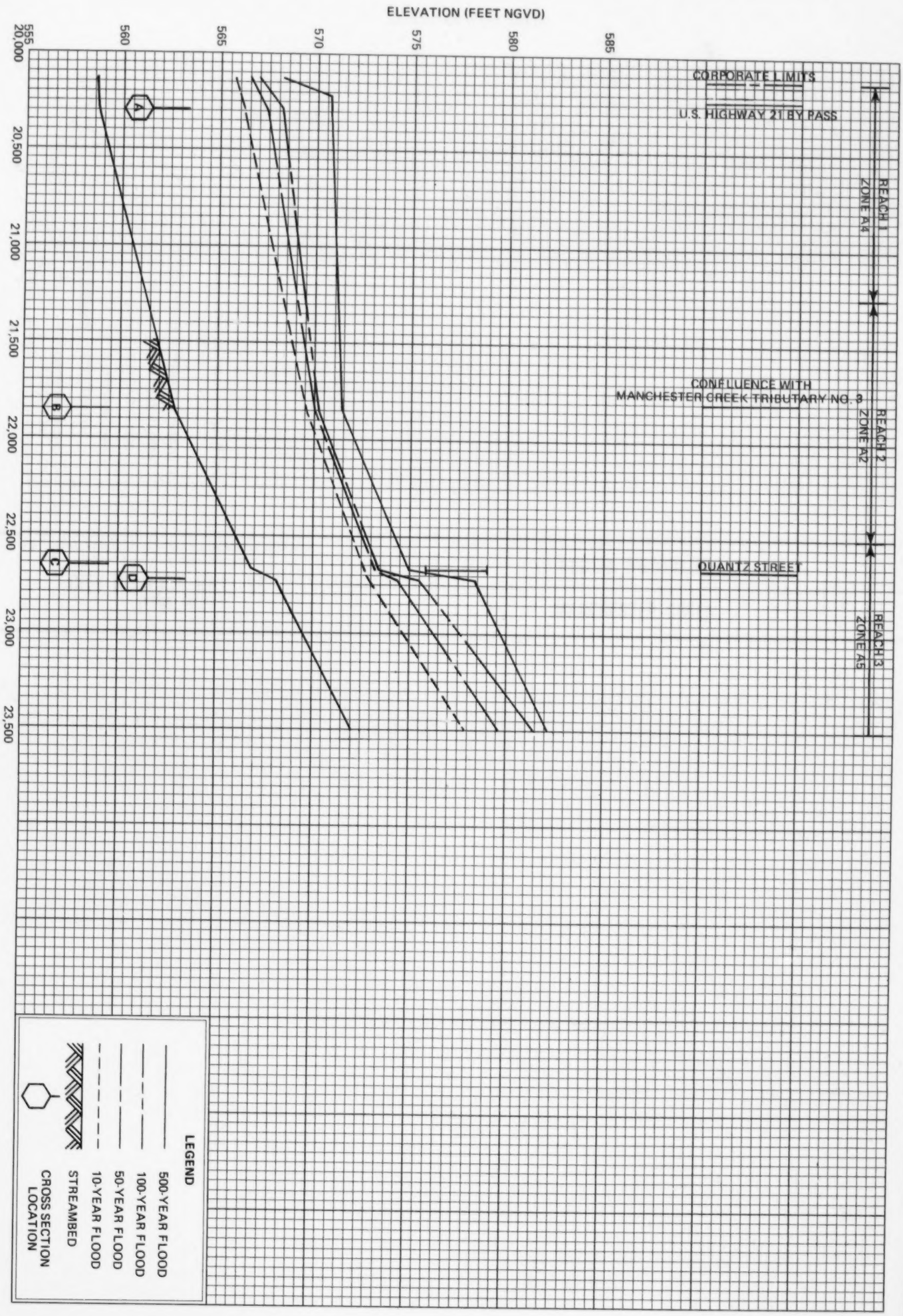

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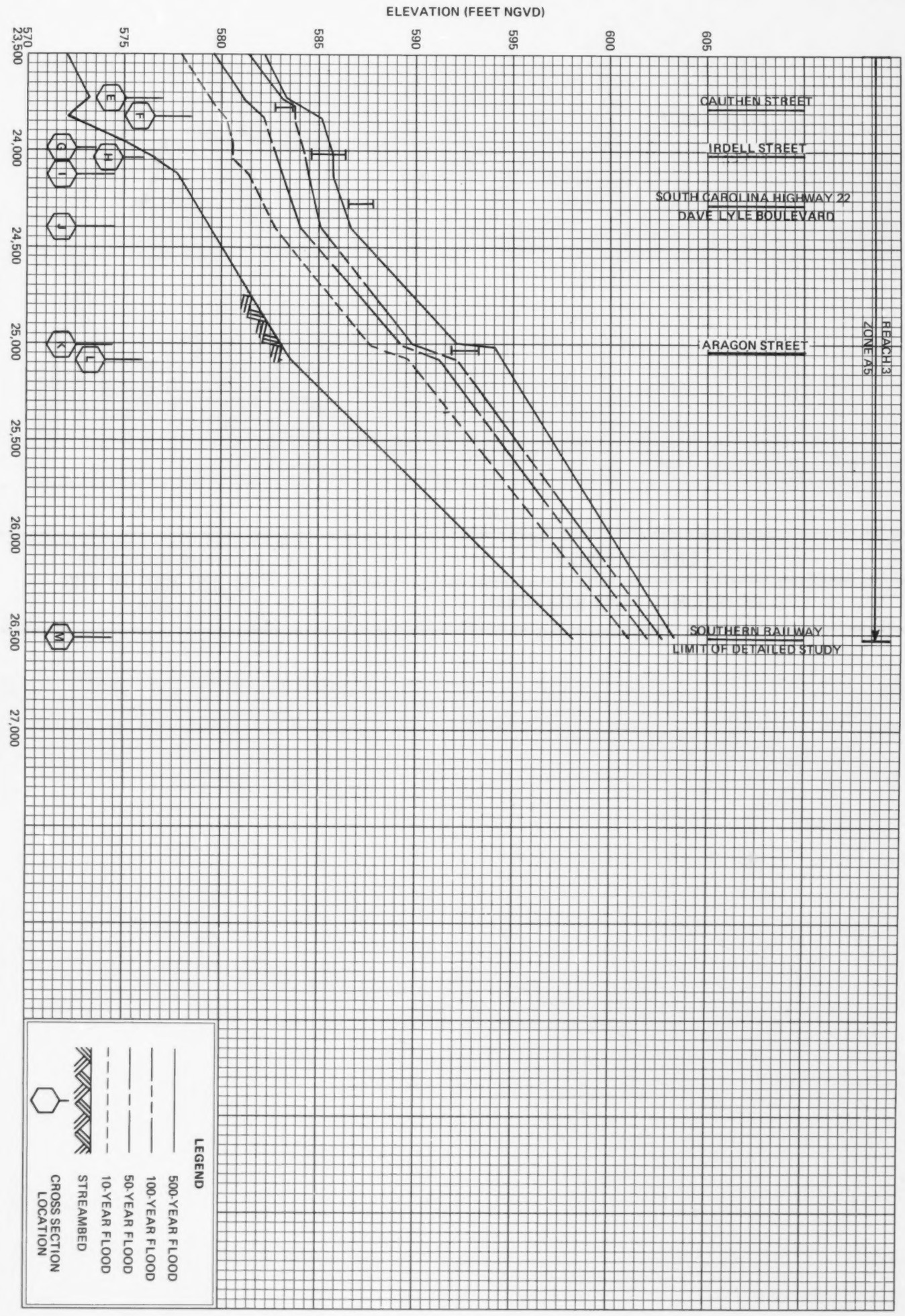

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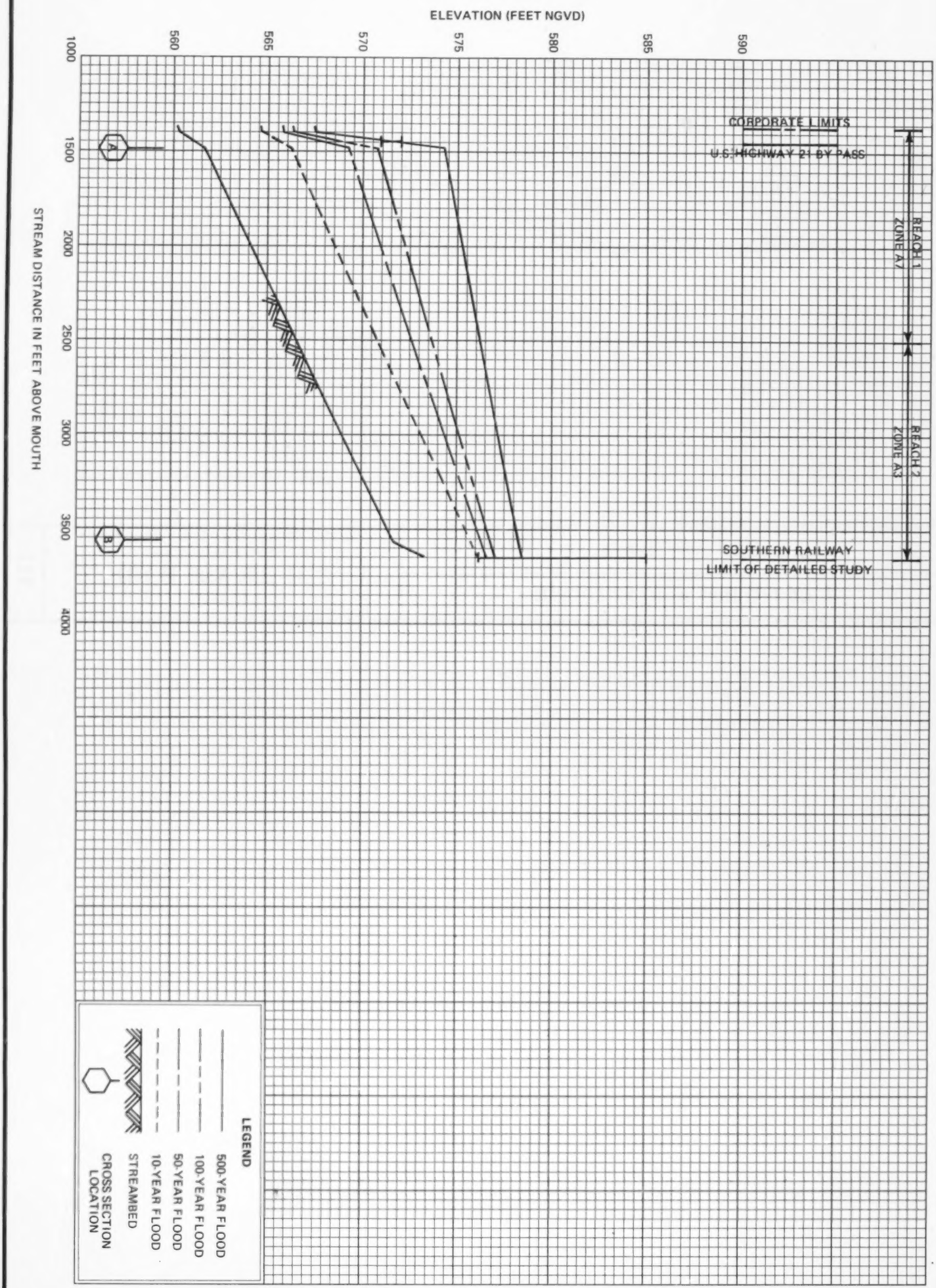
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

MANCHESTER CREEK



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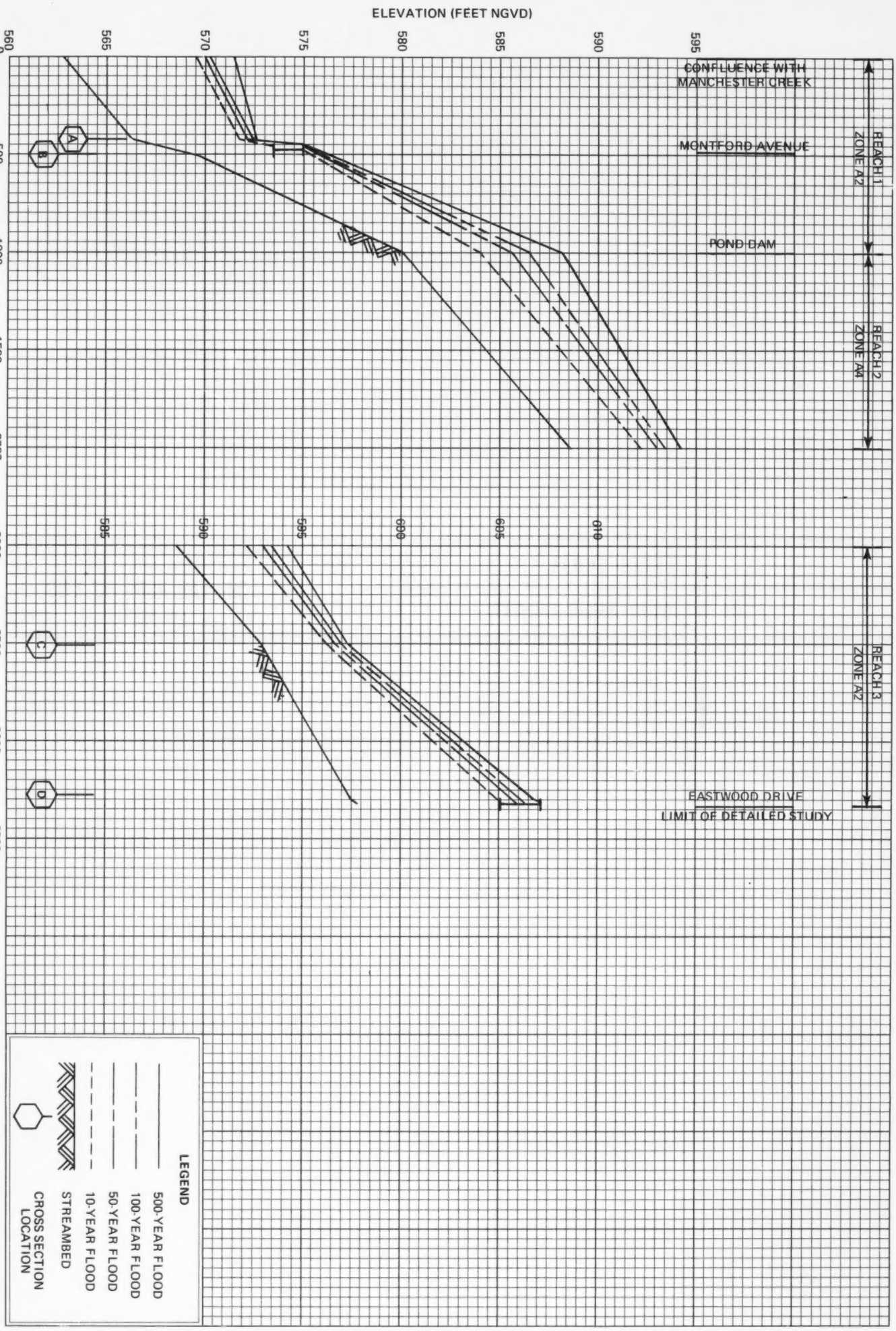

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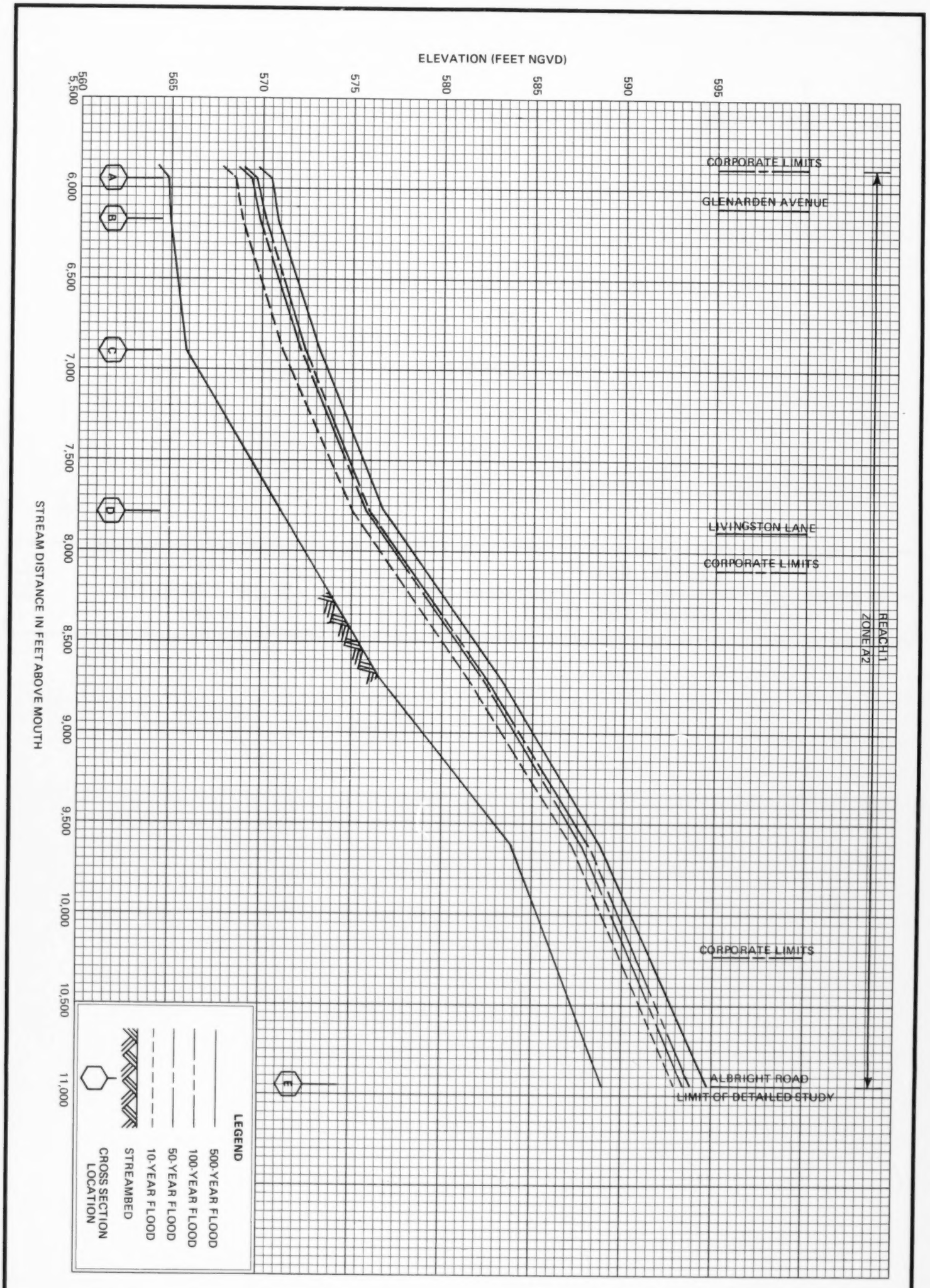
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

MANCHESTER CREEK TRIBUTARY NO. 3



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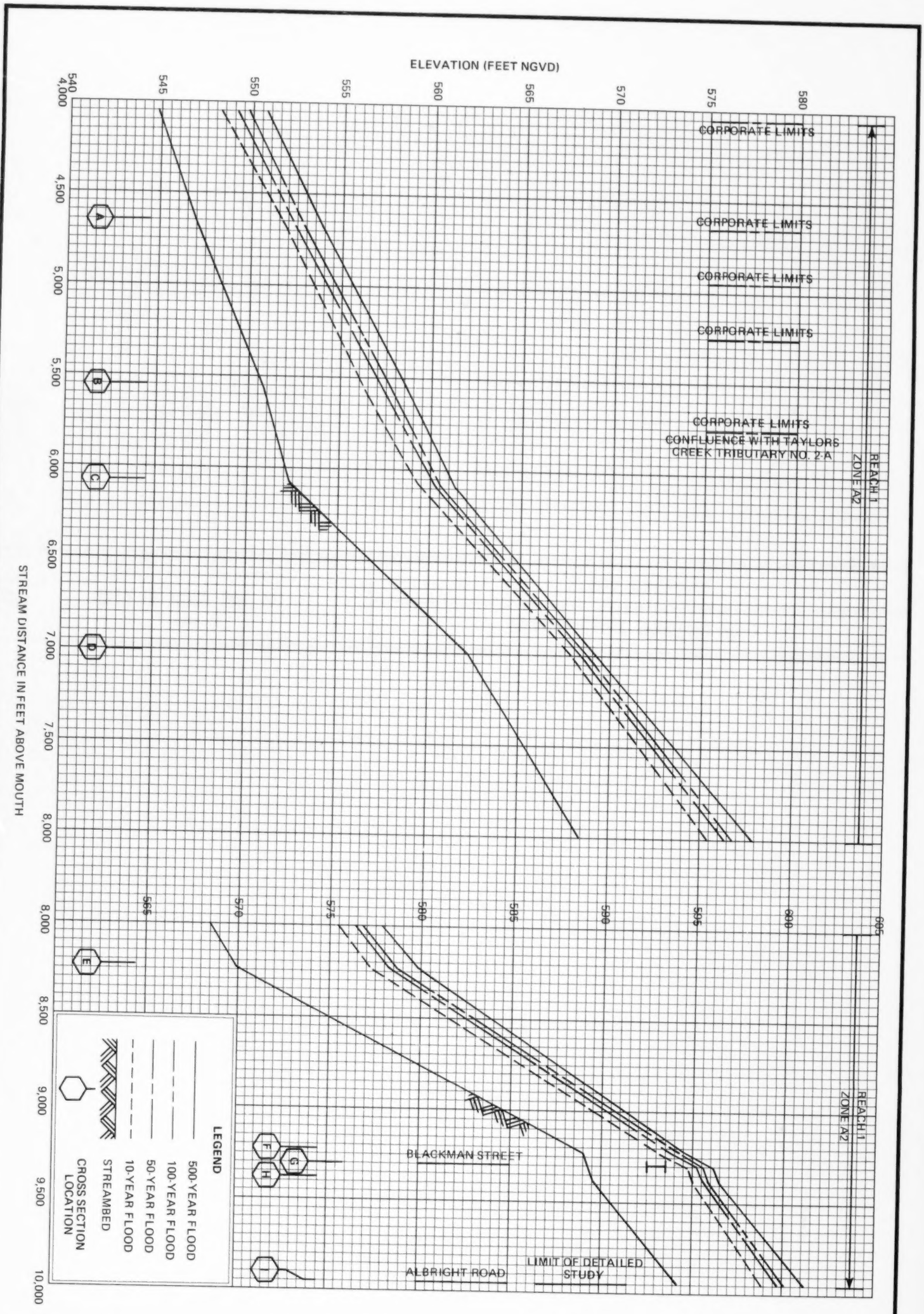
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

TAYLORS CREEK TRIBUTARY NO. 1



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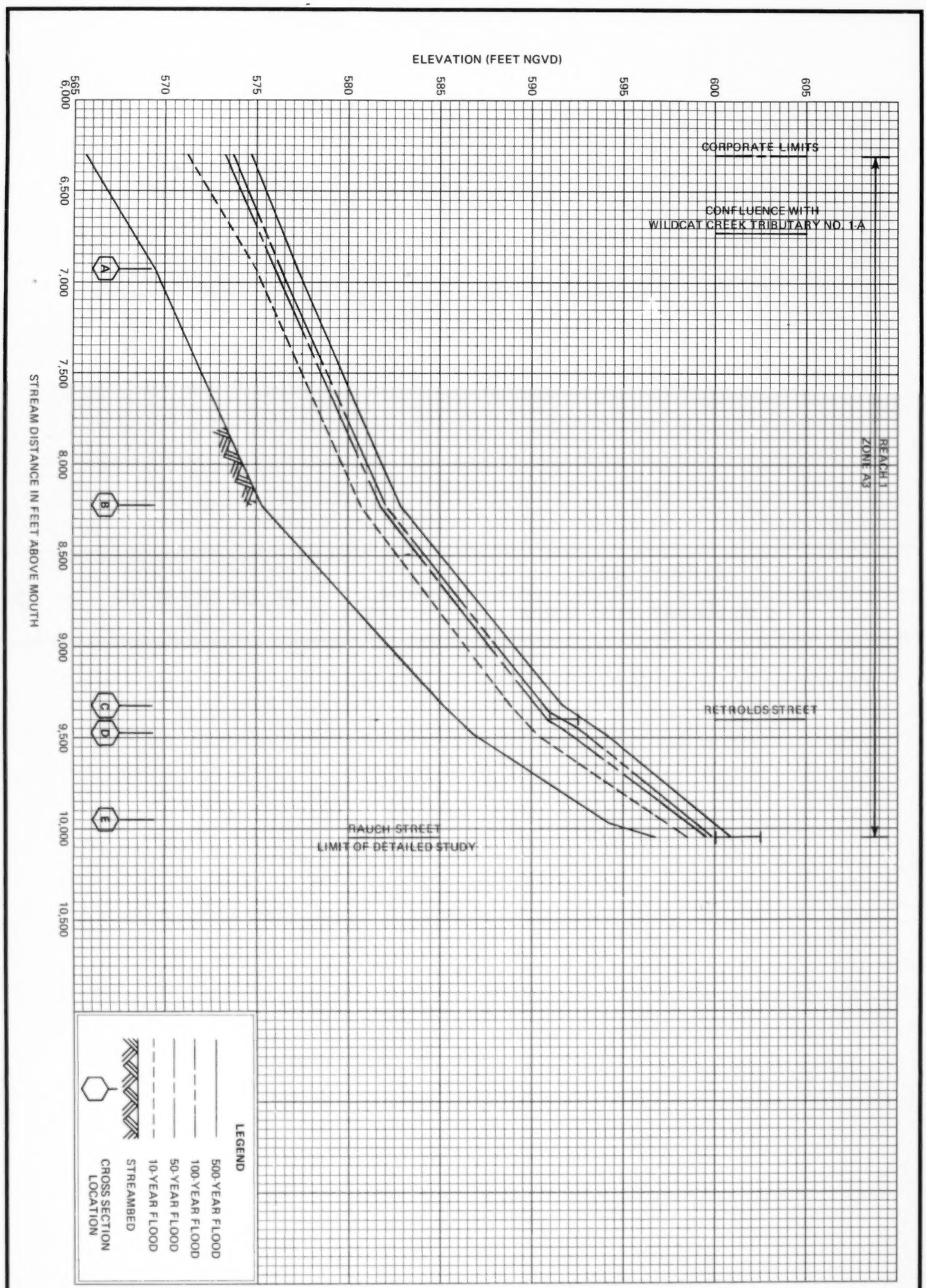
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

TAYLORS CREEK TRIBUTARY NO. 2



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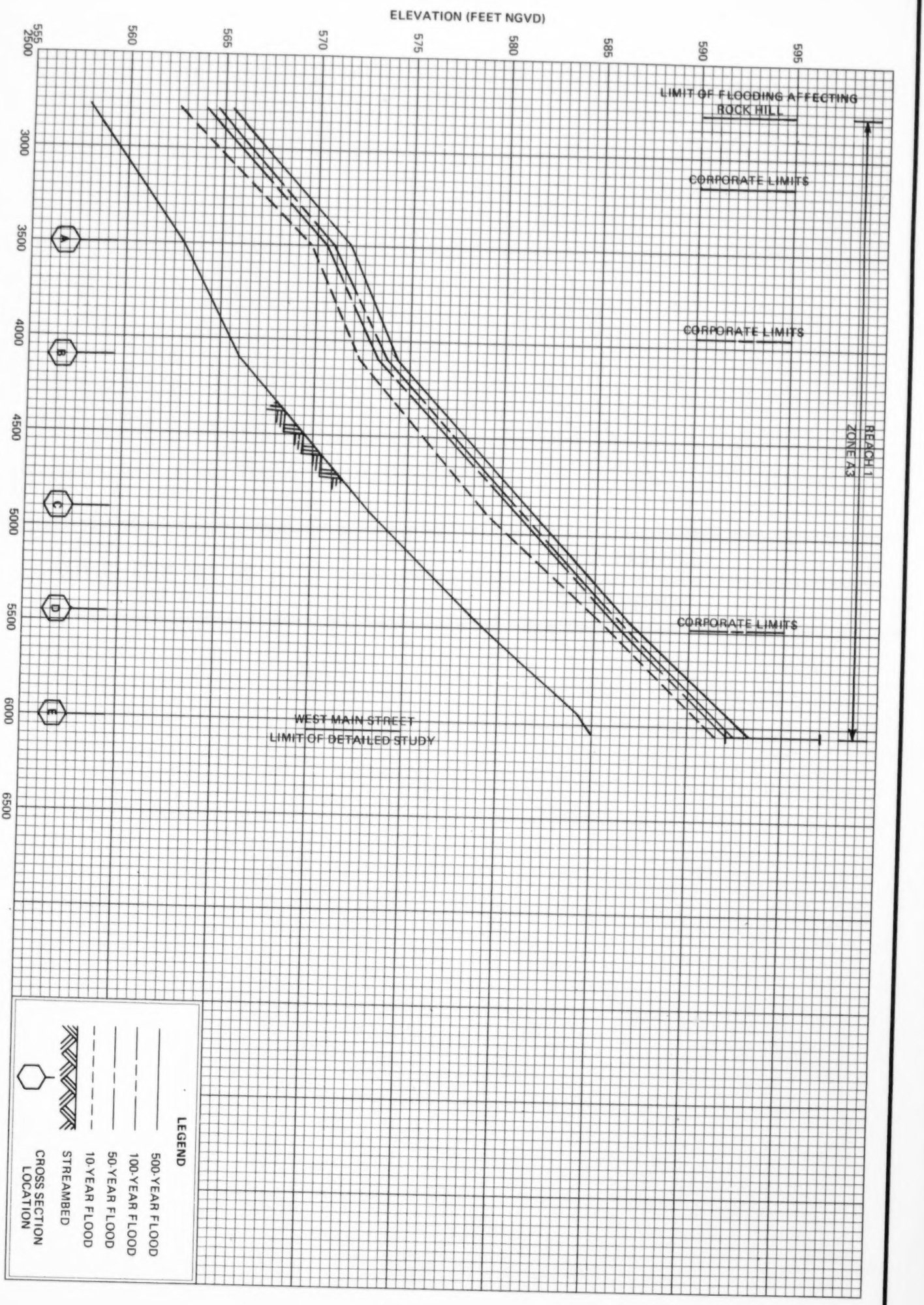
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

WILDCAT CREEK TRIBUTARY NO. 1



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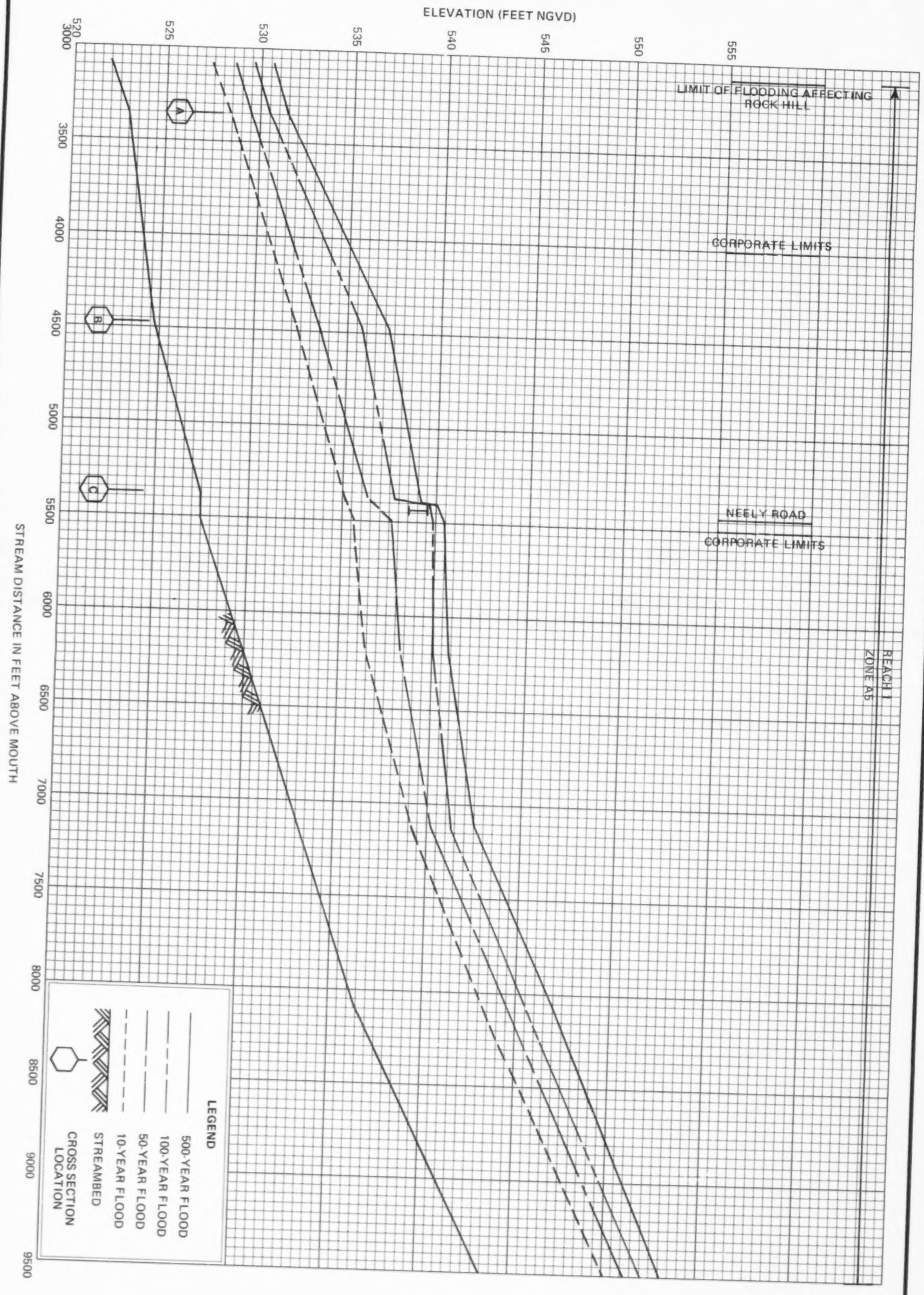
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

WILDCAT CREEK TRIBUTARY NO. 2



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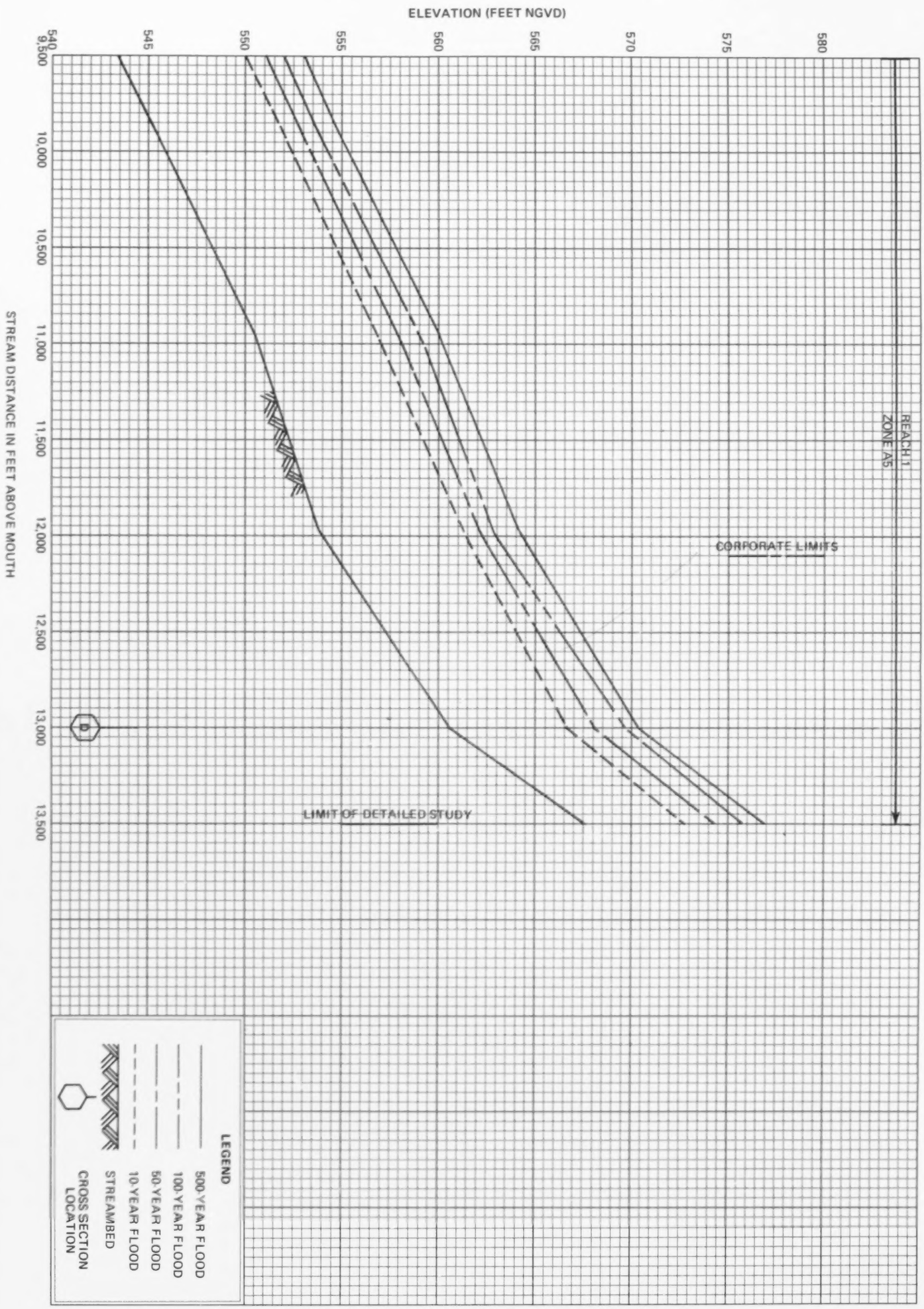
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

STONEY BRANCH



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FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF ROCK HILL, SC
(YORK CO.)

FLOOD PROFILES

STONEY BRANCH